

We claim:

1. A process for preparing catalyst systems of the Ziegler-Natta type, which comprises the following steps:

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A) bringing an inorganic metal oxide into contact with a tetravalent titanium compound and

10 B) bringing the intermediate obtained from step A) into contact with a magnesium compound $MgR^1_nX^{1-2-n}$, where X^1 are each, independently of one another, fluorine, chlorine, bromine, iodine, hydrogen, NR^X_2 , OR^X , SR^X , SO_3R^X or $OC(O)R^X$, and R^1 and R^X are each, independently of one another, a linear, branched or cyclic C_1-C_{20} -alkyl, a C_2-C_{10} -alkenyl, an alkylaryl having 1-10 carbon atoms in the alkyl part and 6-20 carbon atoms in the aryl part or a C_6-C_{18} -aryl and n is 1 or 2,

15 C) bringing the intermediate obtained from step B) into contact with a halogenating reagent, and

D) bringing the intermediate obtained from step C) into contact with a donor compound.

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2. A process for preparing catalyst systems as claimed in claim 1, wherein a magnesium compound MgR^1_2 is used in step B).

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3. A process for preparing catalyst systems as claimed in claim 1 or 2, wherein the halogenating reagent used in step C) is chloroform.

4. A process for preparing catalyst systems as claimed in any of claims 1 to 3, wherein the inorganic metal oxide used in step A) is a silica gel.

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5. A process for preparing catalyst systems as claimed in any of claims 1 to 4, wherein the tetravalent titanium compound used in step A) is titanium tetrachloride.

6. A process for preparing catalyst systems as claimed in claims 1 to 5, wherein the donor compound used in step D) contains at least one nitrogen atom.

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7. A catalyst system of the Ziegler-Natta type which can be prepared by a process as claimed in any of claims 1 to 6.

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8. A prepolymerized catalyst system comprising a catalyst system as claimed in claim 7 and linear C₂-C₁₀-1-alkenes polymerized onto it in a mass ratio of from 1:0.1 to 1:200.

5 9. A process for the polymerization or copolymerization of olefins at from 20 to 150°C and pressures of from 1 to 100 bar in the presence of at least one catalyst system as claimed in claim 7 or 8 and, if appropriate, an aluminum compound as cocatalyst.

10 10. A process for the polymerization or copolymerization of olefins as claimed in claim 9, wherein a trialkylaluminum compound whose alkyl groups each have from 1 to 15 carbon atoms is used as aluminum compound.

11. A process for the polymerization or copolymerization of olefins as claimed in claim 9 or 10, wherein ethylene or a mixture of ethylene and C₃-C₈- α -monolefins is (co)polymerized.

15 12. The use of a catalyst system as claimed in claim 7 or 8 for the polymerization or copolymerization of olefins.

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